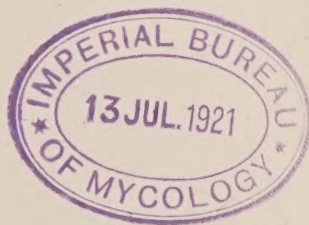


# GEORGIA EXPERIMENT STATION

EXPERIMENT, GEORGIA

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## *Spraying Peaches*




BY

H. P. STUCKEY and B. B. HIGGINS

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The bulletins of this Station are sent free to all "persons actually engaged in farming, who make request for same," and to all newspapers in the State. Address,

H. P. STUCKEY Director,  
Experiment, Georgia.



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## SPRAYING PEACHES.

By H. P. Stuckey and B. B. Higgins.

The peach maladies which we have found most serious in this region and which we have attempted to control are Scab Brown Rot, Leaf curl, Curculio, San Jose Scale, and the Peach tree borer.

### SCAB.

Peach scab is very common, being practically always present on unsprayed trees. It produces small, sooty colored spots on fruit, leaves and twigs. Sometimes on the fruit these spots coalesce until a large area of the peach is covered, in which case it does not ripen normally and is unfit for market. The surface of the scabby area often cracks as the fruit matures and allows the entrance of the Brown Rot. This is perhaps the greatest damage produced by scab, as scabby fruit is almost certain to rot during a wet season.

The disease is produced by a fungus (*Cladosporium carpophilum* Thum.) which passes the winter in the spots on the twigs. During the damp warm days of spring and summer spores are produced on these spots and are carried in drops of water to the young fruit, where they grow and infect the fruit.

One might expect to kill the fungus on the twigs with the winter spray, but it has been found that the fungus grows under the cuticle of the twig and the cuticle protects it from the spray. To protect the fruit it is necessary to have it coated with a spray at the time the spores are produced, which occurs in this region from early April throughout the summer.

### BROWN ROT.

This is the worst enemy which the peach grower has to fight with the possible exception of scale. During wet seasons practically the entire crop may rot on the trees in the unsprayed orchards. It often causes heavy loss in packed fruit in transit.

The rot is produced by a fungus (*Sclerotinia fructigena* (pers.) Schrost.) which may enter the fruit through the uninjured surface, but enters most commonly through wounds such as those produced by the curculio and the cracks produced by scab. The fungus produces immense numbers of spores capable of infecting other fruits. It is therefore important that no peach showing the least sign of rot be picked or packed in containers of sound fruit. The old rotted fruits may serve as a source of infection during the following season. It is therefore well to destroy them if this can be done without too great expense. The main reliance of both grower and shipper is in having fruit properly sprayed before ripening, since the fungus is found on other fruits and is almost always present.

#### PEACH LEAF CURL.

This disease develops almost every year in unsprayed orchards but rarely develops in epidemic form as reported from some other regions.

The causal fungus (*Exoascus deformous* (Berk) Fekl.) attacks the young leaves as they unfold in the spring. The leaves turn yellow, often with a reddish tinge and finally pale green, almost white, the edges are folded and wrinkled, and they drop off with in a few weeks. Spores of the fungus are produced on the surface of such leaves; and they, lodging on the bark and young buds, produce infections the following spring. Such spores are killed by a single spraying just before the buds swell.

#### THE PLUM CURCULIO.

The plum curculio (*Conotrachelus nenuphar*) is of scarcely less importance in its relation to peach injury than any of the above mentioned diseases. This small beetle attacks the young peaches shortly after the blossoms shed. They make a crescent shaped cut in the skin of the young peaches, and deposit the egg just beneath the skin in this crescent. The larvae or grub burrows into the peach, and continues to feed on the inside near the pit, causing the well known wormy peach. The punctures of the peach make conditions favorable for the entrance of Brown Rot,\* thus making the control of the Curculio a prime necessity.



## SAN JOSE SCALE.

The well known San Jose Scale is now kept measurably well under control in the commercial orchards where regular dormant spraying is practiced. But it is still a serious menace to the home orchards of the State. It attacks most your orchard fruits. When the limbs of a peach tree are well covered with this scale, it gives the infested parts a grayish appearance. It causes small sunken areas in the bark which exhibit small red spots when the outer bark is cut away down to the live tissue. The scales multiply very rapidly in the early summer. The young scales crawl out and attach themselves to the new growth. The San Jose Scale is so resistant to sprays that we have to spray the trees during the dormant season in order to be able to use sufficiently concentrated sprays to kill the scale without injury to the tree. This spraying may be done at any time after the leaves shed in the fall until the blossom buds begin to swell in the spring. If the trees are pruned before the spraying is done, it facilitates thoroughness and saves spray materials.

We have tried a large number of proprietary brands of the lime-sulphur mixtures and the miscible oils and have found them generally effective when applied according to directions sent out by the manufacturers. Whether the grower should use lime-sulphur mixtures or miscible oils in spraying against San Jose Scale depends largely upon cost of materials and convenience of supply. If the grower prefers, he can make his concentrated lime-sulphur mixture at home. Where he wishes to use the spray according to specific gravity, the following formula is satisfactory:

Flowers of Sulphur,	100 Lbs.
Good Stone Lime,	50 Lbs.
Water,	50 to 60 Gals.

The sulphur is placed in a convenient receptacle and is made into a thin soupy paste. The lime is then put in, more water added, gradually, and the mixture stirred slowly as the lime slakes. This mixture is then boiled for about one hour in 50 or 60 gallons of water. This concentrate should be strained and corked tightly in barrels or other receptacles until ready for use. It is diluted with water and applied to the trees according to its specific gravity. A diluted solution with a density of 1.03

is sufficiently strong to kill scale during the dormant season. To get the proper number of dilutions, we first get the density of the concentrated solution by testing it with the hydrometer. In making the dilutions it is well to remember the following rule: divide the decimal of the concentrate by the decimal of the spray desired, which gives the number of dilutions. For example, suppose the concentrate shows a hydrometer reading of 1.24. We then divide this decimal .24 by .03, which is the decimal of 1.03, the strength of the spray desired, which gives us 8. We would therefore add 8 gallons of water to one gallon of the concentrated lime-sulphur mixture and spray the trees. This strength is, of course, to be used only during the dormant season since it would severely injure the foliage if applied during the summer.

If the orchardist wishes to make a small amount of lime-sulphur mixture to spray against San Jose Scale, and apply it according to ingredients used rather than by density, the following formula is satisfactory.

Flowers of Sulphur,	16 Lbs.
Stone Lime,	14 Lbs.
Water,	50 Gals.

The sulphur is made into a thin paste with water, the lime added and the mixture boiled in ten or twelve gallons of water for one hour, as described in the above formula. This mixture is then made up to 50 gallons with warm water, then strained into the spray tank, and applied while warm.

### THE PEACH TREE BORER.

The peach tree borer works just beneath the soil around the base of the trees. In the latitude of middle Georgia the adult lays her eggs during the month of August and early September. We have tried a large number of washes and other protective preparations, and have gotten best results from asphaltum, which is a heavy grade of coal tar. The soil is raked away from the peach trees to the depth of an inch or two during the latter half of July. The asphaltum is then applied to the base of the trees, extending six or eight inches above the ground. The soil is then replaced and nothing more done.

During certain seasons, there will be a very light infection fol-



lowing this treatment. In such cases the usual worming may be given in November. In applying this asphaltum it is important that it be put on the bases of the trees before the moth begins to deposit her eggs in early August so that it will act as a repellant and prevent egg deposition.

*Self-Boiled Lime Sulphur Mixture*:—We have tried diluted solutions of commercially prepared lime-sulphur mixtures in comparison with the self-boiled lime sulphur mixtures in the control of the Scab and Brown Rot, and have generally gotten best results from the self-boiled mixture, the formula for which is as follows:

Flowers of Sulphur,	8 Lbs.
Stone Lime,	8 Lbs.
Water,	50 Gals.

The sulphur is made into a thin paste with water, the stone lime then put in, more water added gradually, and the mixture stirred slowly as the lime slakes. The heat of the slaking lime cooks the mixture sufficiently for spraying peach trees in foliage. When the lime has finished slaking the mixture should be cooled down by adding an abundance of cold water at once so as to prevent the further formation of sulphides in the mixture, which are more or less injurious to peach foliage. This mixture is made up to 50 gallons with cold water and the sediment strained out when it is ready for application to the trees.

#### SUMMER SPRAYS OF LIME SULPHUR MIXTURES ACCORDING TO DENSITY.

Where one wishes to spray peaches in foliage with lime-sulphur solutions, this may be done by taking the concentrated lime-sulphur mixture as recommended for spraying against San Jose Scale in winter and multiplying the number of dilutions by 10. For example, instead of adding 8 gallons of water to one gallon of concentrate, add 80 gallons of water to one gallon of the concentrate for a summer spray. This gives a density of 1.003, the correct density of a lime sulphur mixture for spraying peach trees in foliage.

## ARSENATE OF LEAD AND LIME MIXTURE.

In spraying against the Curculio, the following mixture should be used:

Dry or Powdered Arsenate of Lead,	1 Lb. 1 Oz.
Stone Lime,	3 Lbs.
Water,	50 Gals.

If the arsenate of lead comes in the paste form, two pounds of it should be used instead of the 1 Lb, 1 Oz. of the powdered form. In preparing this mixture the lime is slaked, a few gallons of water added and the coarse sediments strained out. The arsenate of lead is thoroughly mixed with a few quarts of water, and the two solutions mixed together. This mixture is then made up to 50 gallons with water, when it is ready for spraying. Where it is desired to use the arsenate of lead with the lime-sulphur mixture, the arsenate of lead is made into a thin soupy paste with water and stirred into the lime-sulphur mixture without the addition of lime. In the control of the Brown Rot, Scab, and the Curculio, it is often feasible to compound one mixture effective against all three, viz.: Lime-sulphur and Arsenate of Lead.

## SCHEDULE FOR SPRAYING DIFFERENT VARIETIES IN SUMMER.

In spraying peaches against Scab, Brown Rot and the Curculio, it is advisable to regulate the number of sprayings by the time of ripening of the variety.

Extra early varieties, such as the Mayflower, Victor, Sneed and Uneeda, should have only two sprayings. Give the first about ten days after the blossoms shed, or about the time the calices (shucks) begin to fall. At this spraying use the arsenate of lead and lime mixture, according to above formula. The second spraying should be given about the first of May or about three and one-half weeks before the fruit ripens. This spray should be given with lime-sulphur and arsenate of lead combined. The self-boiled lime-sulphur mixture will serve well for this application in controlling the Brown Rot, but it discolors the fruit, applied so near the ripening date, and for this reason it is advisable to use the concentrated liquid of the lime-sulphur diluted with water to a specific gravity of 1.003.

Mid-season varieties, such as Bell, Crawford, Elberta, Hale, and Corosa, should be sprayed same as recommended for the early varieties, and given a third application of lime-sulphur mixture, omitting the arsenate of lead, about four weeks before the fruit ripens.

Late varieties, such as White English, Stinson, and Salway, should have four sprayings. The first two given same as recommended for early varieties, the third about three weeks later with lime-sulphur alone, and the fourth about four weeks before the fruit ripens with the same mixture as used in the third. If it is necessary to omit one of these sprays let it be the third.

### STICKERS FOR SPRAYS.

We have tried several materials, and a number of combinations of them, such as soap, rosin, and gelatin, added to lime-sulphur mixtures as stickers or to make the spray more adhesive. Among these, fish oil soap, and the well known caustic soda-rosin stickers gave best results.

Stickers serve their best purposes in holding on the sprays during rainy weather.

### BORDEAUX MIXTURE FOR PEACHES.

We wish to emphasize the importance of keeping Bordeaux mixture and sprays containing solutions of copper salts away from peach trees in foliage. Any spray we have tried, including a number of proprietary brands, which contain sufficient copper sulphate (blue stone) to be rated as a fungicide, were more or less injurious to peach foliage.

### EFFECT OF LIME-SULPHUR ON PEACH FOLIAGE.

May 15, 1913, six plats of uniform Elberta seedling peach trees were selected and sprayed with lime-sulphur solution with the following densities:

Plat No.	Density of Solution
1 -----	1.003
2 -----	1.004
3 -----	1.005
4 -----	1.006
5 -----	1.007
6 -----	1.008



On May 20th or five days later, the following notes were recorded on the condition of the foliage:

Foliage on trees of plat 1 and 2, not injured.

Foliage of plat 3 burned and about 5 per cent of the leaves had fallen.

Plat 4, similar to plat 3, only about twice as many leaves had fallen.

Plat 5, Only a few leaves had fallen, though where the spray droplets had accumulated on the leaves distinct circular holes had been made.

Plat 6, still fewer leaves had fallen than on plat 5, though a greater number and larger circular holes had been burned through the leaves.

Plat 4, receiving a density of 1.006, showed a greater tree injury, and lost a greater amount of foliage than did the trees of any of the other plats. The stronger sprays seemed to burn through the foliage immediately, and leave numerous holes, but did less injury to the foliage, as a whole, than that of plat 4, as above mentioned.

Incidentally, the spray with a density of 1.008 was applied to a plat of trees each of Japan persimmons, pecans and citrus trifoliatta, the same day the peach trees were sprayed. The tender tips of the Japan persimmon trees were slightly burned, but the pecan and the citrus trees showed no signs of injury.

### SPRAY EQUIPMENT.

The size and type of outfit the grower should buy will depend upon the area to be sprayed. The commercial grower will, of course, need a power outfit, but we think the ordinary barrel pump with hose and extension rod attached is most suitable to the owner of a home orchard.

The pump may be purchased and installed in a syrup or vinegar barrel by any one handy with tools. One lead of hose 14 to 25 feet long, a ten foot bamboo extension rod, equipped with a simplex or tripple Vermorel nozzle, and a strainer, are about all that is necessary in the way of an outfit for the home orchard. The barrel containing the pump and attachments may be set into a one-horse wagon, filled with the spray solution desired, and driven to the orchard, where it is operated by two men. One man

doing the pumping and drives the wagon, while the other sprays the trees.

An outfit of this kind will cost from eighteen to thirty dollars, depending upon the size and grade of outfit purchased. It will be found very convenient to reach the trees without so much driving and will serve well also to reach across several rows in spraying crops of vegetables.







